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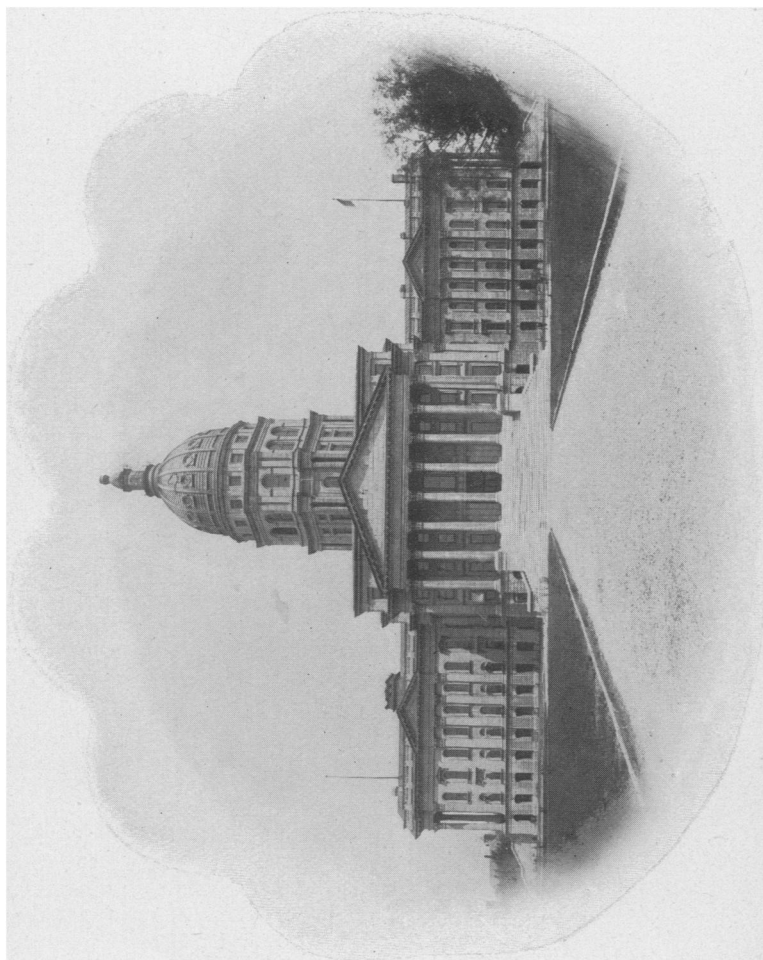
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TRANSACTIONS
OF THE
KANSAS
ACADEMY OF SCIENCE,
VOL. XX, PART I.

CONTAINS
LIST OF OFFICERS, PAST AND PRESENT; MEMBERSHIP LIST
JANUARY 10, 1906; THE PRESIDENT'S ADDRESS; MINUTES OF
THE THIRTY-EIGHTH MEETING OF THE ACADEMY;
ALSO, A FEW ILLUSTRATIONS AND SOME
OF THE PAPERS PRESENTED.

J. T. LOVEWELL, SECRETARY.

STATE PRINTING OFFICE,
TOPEKA, 1906.



STATE CAPITOL BUILDING.
Containing rooms of the Kansas Academy of Science.

TRANSACTIONS
OF THE
KANSAS
ACADEMY OF SCIENCE,
VOL. XX, PART I.

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LIST OF OFFICERS, PAST AND PRESENT; MEMBERSHIP LIST
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THE THIRTY-EIGHTH MEETING OF THE ACADEMY;
ALSO, A FEW ILLUSTRATIONS AND SOME
OF THE PAPERS PRESENTED.

DECEMBER, 1905.

STATE PRINTING OFFICE,
TOPEKA, 1906.

OFFICERS OF THE ACADEMY FOR 1906.

<i>President</i>	F. O. MARVIN.....	Lawrence.
<i>Vice-presidents</i>	{ B. F. EYER.....	Manhattan.
	{ J. E. WELIN	Lindsborg.
<i>Treasurer</i>	ALVA J. SMITH.....	Emporia.
<i>Secretary</i>	J. T. LOVEWELL.....	Topeka.

Past Officers of the Academy.

PRESIDENTS.

1869, '70.. B. F. Mudge.	1893..... E. H. S. Bailey.
1871-'73.. John Fraser.	1894..... L. E. Sayre.
1874-'78.. F. H. Snow.	1895..... Warren Knaus.
1879, '80.. B. F. Mudge.	1896..... D. S. Kelly.
1881, '82.. J. T. Lovewell.	1897..... S. W. Williston.
1883..... A. H. Thompson.	1898..... D. E. Lantz.
1884, '85.. R. J. Brown.	1899..... E. B. Knerr.
1886..... E. L. Nichols.	1900..... A. S. Hitchcock.
1887..... J. D. Parker.	1901..... E. Miller.
1888..... J. R. Mead.	1902..... J. T. Willard.
1889..... T. H. Dinsmore, jr.	1903..... J. C. Cooper.
1890..... G. H. Failyer.	1904..... Edward Bartow.
1891..... Robert Hay.	1905..... L. C. Wooster.
1892..... E. A. Popenoe.	

VICE-PRESIDENTS.

1869, '70.. J. S. Whitman.	1891..... F. W. Cragin, O. C. Charlton.
1871..... B. F. Mudge.	1892..... F. O. Marvin, Mrs. N. S. Kedzie.
1872, '73.. B. F. Mudge, Dr. R. J. Brown.	1893..... J. T. Willard, E. B. Knerr.
1874..... J. A. Banfield, J. D. Parker.	1894..... I. D. Graham, J. D. Hewitt.
1875..... B. F. Mudge, J. D. Parker.	1895..... I. D. Graham, S. W. Williston.
1876, '77.. B. F. Mudge.	1896..... S. W. Williston, D. E. Lantz.
1878..... B. F. Mudge, J. H. Carruth.	1897..... D. E. Lantz, A. S. Hitchcock.
1879-'82.. J. H. Carruth, Joseph Savage.	1898..... C. S. Parmenter, L. C. Wooster.
1883..... J. R. Mead, G. E. Patrick.	1899..... A. S. Hitchcock, J. R. Mead.
1884..... F. H. Snow, Joseph Savage.	1900..... E. Miller, J. C. Cooper.
1885..... E. L. Nichols, G. H. Failyer.	1901..... J. C. Cooper, L. C. Wooster.
1886..... J. D. Parker, N. S. Goss.	1902..... Edward Bartow, J. A. Yates.
1887..... J. R. Mead, E. H. S. Bailey.	1903..... Edward Bartow, J. A. Yates.
1888..... E. H. S. Bailey, T. H. Dinsmore, jr.	1904..... L. C. Wooster, B. F. Eyer.
1889..... E. H. S. Bailey, G. H. Failyer.	1905..... W. A. Harshbarger, F. W. Bushong.
1890..... D. S. Kelly, F. W. Cragin.	1906..... B. F. Eyer, J. E. Welin.

SECRETARIES.

1869-'73.. J. D. Parker.	1893..... A. M. Collette.
1874, '75.. John Wherrell.	1894-'98.. E. B. Knerr.
1876, '77.. Joseph Savage.	1899-'01.. D. E. Lantz.
1878-'89.. E. A. Popenoe.	1902-'04.. G. P. Grimsley.
1890-'92.. E. H. S. Bailey.	1905..... J. T. Lovewell.

TREASURERS.

1869-'73.. F. H. Snow.	1891..... F. O. Marvin.
1873-'75.. R. J. Brown.	1892-'95.. D. S. Kelly.
1876, '77.. W. K. Kedzie.	1896..... L. E. Sayre.
1878-'83.. R. J. Brown.	1897-'00.. J. W. Beede.
1884, '85.. A. H. Thompson.	1901, '02.. E. C. Franklin.
1886-'90.. I. D. Graham.	1903-'05.. Alva J. Smith.

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MEMBERSHIP OF THE ACADEMY,

January 10, 1906.

HONORARY MEMBERS.

G. P. Grimsley, Ph. D., 1904, assistant state geologist, Morgantown, W. Va.
 Rev. Johns D. Parker, 1897..... New Haven, Conn.
 Arnold B. Johnson, 1897, U. S. Lighthouse Board.... Washington, D. C.
 W. A. Kellerman, Ph. D., 1897, Ohio State University, Columbus, Ohio.
 Edw. L. Nichols, Ph. D., 1897, Cornell University.... Ithaca, N. Y.
 W. S. Franklin, Sc. D., 1897, Lehigh University..... South Bethlehem, Pa.
 Geo. Wagner, Phar. C., 1904, University of Wisconsin, Madison, Wis.
 S. W. Williston, Ph. D., 1902, University of Chicago, Chicago, Ill.

ASSOCIATE MEMBERS.

Mrs. R. J. Brown, 1903..... Leavenworth.
 Mrs. Mary Savage, 1897..... Lawrence.

LIFE MEMBERS.

Dates printed in the following list signify date of election to membership in the Academy.

E. H. S. Bailey, Ph. D., 1883, University of Kansas.. Lawrence.
 F. W. Cragin, M. S., 1880..... Colorado Springs.
 L. L. Dyche, M. S., 1881, University of Kansas..... Lawrence.
 Geo. H. Failyer, Ph. D., 1879, Department of Agr.... Washington, D. C.
 E. C. Franklin, Ph. D., 1884, Leland Stanford Jr. Univ., Stanford Univ., Cal.
 I. D. Graham, 1879, *Kansas Farmer*..... Topeka.
 Erasmus Haworth, Ph. D., 1882, University of Kansas, Lawrence.
 Warren Knaus, M. S., editor *McPherson Democrat*... McPherson.
 D. E. Lantz, M. S., 1887, Biological Survey..... Washington, D. C.
 J. T. Lovewell, Ph. D., 1878, secretary Ac. of Sci.... Topeka.
 F. O. Marvin, C. E., 1884, University of Kansas..... Lawrence.
 J. R. Mead, 1879..... Wichita.
 Ephraim Miller, Ph. D., 1873, University of Kansas.. Lawrence.
 E. A. Popenoe, A. M., 1872, Kansas Agr. College.... Manhattan.
 L. E. Sayre, Ph. M., 1885, University of Kansas..... Lawrence.
 Alva J. Smith, 1903, county surveyor..... Emporia.
 B. B. Smyth, 1880, curator Goss ornith. collection... Topeka.
 F. H. Snow, Ph. D., 1868, University of Kansas..... Lawrence.
 A. H. Thompson, D. D. S., 1873..... Topeka.
 D. M. Valentine, LL. D., 1878..... Topeka.
 M. L. Ward, D. D., 1880, Ottawa University..... Ottawa.
 J. T. Willard, M. S., 1883, Kansas Agr. College.... Manhattan.
 S. W. Williston, Ph. D., 1880, University of Chicago, Chicago, Ill.

ANNUAL MEMBERS.

L. O. Adams, 1903, University of Kansas.....	Lawrence.
Orr Adams, 1898.....	Telluride, Colo.
Frank G. Agrelus, 1905.....	Lawrence.
H. C. Allen, 1904.....	McPherson.
Carroll D. Armstrong, M. D., 1905.....	Salina.
John J. Arthur, 1904.....	Topeka.
W. R. Arthur, 1903, A. B., high school.....	Logan.
C. H. Ashton, 1903, University of Kansas.....	Lawrence.
Alfred W. Ayers, 1904, minister Cong. church.....	Onaga.
Harvey W. Baker, 1902, Kansas Agricultural College, Manhattan.	
M. A. Barber, 1904, University of Kansas.....	Lawrence.
Elam Bartholomew, M. S., 1895.....	Stockton.
Edward Bartow, Ph. D., 1897, University of Kansas..	Lawrence.
Wm. C. Bauer, A. M., 1897, Baker University.....	Baldwin.
W. J. Baumgartner, 1904, University of Kansas.....	Lawrence.
Frank G. Bedell, 1904.....	Iola.
J. W. Beede, Ph. D., 1894, University of Indiana....	Bloomington, Ind.
Edw. Bumgardner, M. D., 1896.....	Lawrence.
F. W. Bushong, B. S., 1896, Kansas City University, Kansas City, Kan.	
H. P. Cady, 1904, University of Kansas.....	Lawrence.
M. E. Canty, 1903.....	Buffalo.
Chas. I. Corp, 1905, University of Kansas.....	Lawrence.
Clarence L. Cole, M. D., 1902.....	Washington, D. C.
Ewing N. Collett, 1903, Indian University.....	Bacone, I. T.
Rev. John T. Copley, 1903.....	Clinton.
J. C. Cooper, 1899.....	Topeka.
R. W. Coppedge, 1905, high school.....	Topeka.
E. G. Corwine, 1905, student.....	Mulvane.
W. R. Crane, 1904, University of Kansas.....	Lawrence.
Ralph K. Crawford, 1904, University of Kansas.....	Lawrence.
F. F. Crevecoeur, 1899.....	Onaga.
Robert W. Curtis, Ph. D., 1904, University of Kansas,	Lawrence.
F. B. Dains, Ph. D., 1902, Washburn College.....	Topeka.
R. E. Davis, 1904.....	Fort Scott.
Geo. A. Dean, 1903, Kansas Agricultural College....	Manhattan.
Emil O. Deere, 1905, Bethany College.....	Lindsborg.
S. D. Dice, 1904, public schools.....	Alma.
James Dickson, 1904, University of Kansas.....	Lawrence.
Hugo Diemer, M. E., 1903, University of Kansas....	Lawrence.
R. B. Dunlevy, B. S., 1896, Southwest Kansas College, Winfield.	
E. X. H. Dunmire, 1905, University of Kansas.....	Lawrence.
Harry Eagle, 1905, student.....	Topeka.
J. Whit Ebey, 1903, science teacher.....	Howard.
H. W. Emerson, 1904, University of Kansas.....	Lawrence.
H. W. Ewing, D. D. S., 1903, Iola Gas Company.....	Iola.
B. F. Eyer, B. S., 1894, Kansas Agricultural College, Manhattan.	
Fred Faragher, 1904.....	Lawrence.
Thos. B. Ford, 1905, University of Kansas.....	Lawrence.
Lillian E. Fowler, 1905, Ottawa high school.....	Ottawa.

ANNUAL MEMBERS.

A. O. Garrett, 1901, high school.....	Salt Lake City, Utah.
Chas. N. Gould, B. S., 1903, University of Oklahoma,	Norman, Okla.
C. F. Gustafson, 1899, Kansas City high school	Kansas City, Mo.
Brice E. Hammers, 1904, chemist Santa Fe shops....	Topeka.
J. O. Hamilton, 1903, Kansas Agricultural College....	Manhattan.
Dr. Eva Harding, 1904.....	Topeka.
H. J. Harnly, B. S., 1893, McPherson College.....	McPherson.
W. A. Harshbarger, B. S., 1902, Washburn College....	Topeka.
Frank Hartman, 1905, student.....	Kansas City, Kan.
L. D. Havenhill, 1904, University of Kansas.....	Lawrence.
H. D. Hess, 1904, University of Kansas.....	Lawrence.
W. E. Henderson, 1901.....	Iola.
Francis C. Herr, 1905, physician.....	Ottawa.
W. C. Hoad, 1904, University of Kansas.....	Lawrence.
Geo. J. Hood, 1904, University of Kansas.....	Lawrence.
Geo. H. Hoxie, M. D., 1902, University of Kansas...	Lawrence.
W. F. Hoyt, A. M., 1902, Kansas Wesleyan University,	Salina.
L. C. Hodson, 1905, University of Kansas.....	Lawrence.
B. C. Hubbell, 1905.....	Concordia.
Albert K. Hubbard, 1904, University of Kansas.....	Lawrence.
Thos. M. Iden, 1897, State Normal School.....	Emporia.
F. B. Isely, B. S., 1902, high school.....	Wichita.
John J. Jewett, 1902.....	Sawtelle, Cal.
Carl Johns, 1900, Bethany College	Lindsborg.
A. W. Jones, B. S., 1894, Kansas Wesleyan University..	Salina.
Hugo Kahl, 1897, Carnegie Museum.....	Pittsburg, Pa.
George F. Kay, 1904, State University.....	Lawrence.
W. H. Keller, 1898, Atchison county high school	Effingham.
Harry L. Kent, 1904, high school	Hays City.
John H. Klopfer, 1904.....	Topeka.
E. B. Knerr, Sc. D., 1889.....	Atchison.
Rev. James G. Knotter, 1903.....	Dexter.
Pierce Larkin, 1902, University of Oklahoma.....	Norman, Okla.
B. E. Lewis, 1904, city schools.....	Eureka.
C. H. Lyon, 1900, high school.....	Emporia.
Hester E. Loveall, 1904.....	Fort Scott.
H. T. Martin, 1902, University of Kansas.....	Lawrence.
R. Matthews, D. D. S., 1898.....	Wichita.
Walter E. Matthewson, 1903, Kansas Agr. College...	Manhattan.
F. M. McClenahan, 1903, Kansas Agricultural College..	Manhattan.
C. E. McClung, 1903, University of Kansas.....	Lawrence.
Elmer V. McCollum, 1902, University of Kansas.....	Lawrence.
Edith A. McIntyre, B. S., 1902.....	Middletown, N. Y.
D. F. McFarland, 1903, University of Kansas.....	Lawrence.
J. M. McWharf, M. D., 1902.....	Ottawa.
W. G. Medcraft, 1904, Kansas Wesleyan University..	Salina.
Grace R. Meeker, 1899.....	Ottawa.
C. F. Menninger, M. D., 1903.....	Topeka.
H. L. Miller, 1904, high school.....	Topeka.

ANNUAL MEMBERS.

Roy L. Moodie, 1904, University of Kansas	Lawrence.
L. N. Morscher, 1900, high school	Lawrence.
Travis Morse, 1903	Iola.
J. H. Newby, 1899, photographer	Osage City.
A. M. Nissen, A. M., 1888, high school	Wetmore.
Henry N. Olson, 1905, Bethany College	Lindsborg.
D. H. Otis, M. S., 1897	Madison, Wis.
W. K. Palmer, M. E., 1897, consulting engineer	Kansas City, Mo.
Frank Patrick, 1903	Topeka.
Leslie F. Paull, 1903, manual-training school	Kansas City, Mo.
L. M. Peace, 1904, University of Kansas	Lawrence.
Norman Plass, D.D., 1902, president Washburn College,	Topeka.
S. F. Poole, B. S., 1902, Fairmount College	Wichita.
Charles H. Popenoe, 1903, Kansas Agricultural College,	Manhattan.
J. M. Price, A. M., 1900	Atchison.
C. S. Prosser, M. S., 1892, Ohio State University	Columbus, Ohio.
W. S. Prout, 1904	Topeka.
Albert B. Reagan, 1904, Indian school	Rosebud, S. Dak.
W. F. Rice, 1902, public schools	Gordon.
W. B. Robertson, 1905, student	Lawrence.
A. P. Ruediger, 1905	Lawrence.
Lumina C. Riddle, M. S., 1902	Columbus, Ohio.
Arthur Ringer, 1902, Atchison county high school	Effingham.
W. G. Russell, 1905	Russell.
Richard Scammon, 1905, student	Lawrence.
D. C. Schaffner, 1903, College of Emporia	Emporia.
J. H. Schaffner, A. M., M. S., 1902, Ohio State University,	Columbus, Ohio.
Theo. H. Scheffer, 1903, Kansas Agricultural College,	Manhattan.
Eva Schley, 1903, high school	Topeka.
Aaron Schuyler, 1904, Kansas Wesleyan University ...	Salina.
C. H. Shattuck, 1899, Washburn College	Topeka.
Roscoe H. Shaw, 1904, University of Nebraska	Lincoln, Neb.
J. L. Shearer, 1902, public schools	Halstead.
E. T. Shelley, M. D., 1892	Atchison.
R. S. Sherwin, 1904	Norman, Okla.
Claude J. Shirk, 1905, teacher of science	McPherson.
J. A. G. Shirk, 1904, University of Kansas	Lawrence.
Paul L. Shuey, 1905, University of Kansas	Lawrence.
Ralph C. Shuey, 1905, University of Kansas	Lawrence.
Eugene G. Smyth, 1901	Topeka.
Wesley N. Speckman, Ph. D., 1903, Kan. Wesl. Univ.,	Salina.
B. T. Stauber, D. D., 1903	Salina.
S. G. Stewart, M. D., 1904	Topeka.
Chas. M. Sterling, 1904, University of Kansas	Lawrence.
Chas. H. Sternberg, 1895	Lawrence.
Teresa Stevenson, 1901	Ottawa.
W. C. Stevens, 1904, University of Kansas	Lawrence.
E. F. Stimpson, University of Kansas	Lawrence.
A. J. Stout, 1904, high school	Topeka.

ANNUAL MEMBERS.

R. S. Sherwin, 1901	Norman, Okla.
Frank Strong, 1905, chancellor of University	Lawrence.
Olin Templin, 1904.	Lawrence.
A. M. Ten Eyck, 1903, Kansas Agricultural College..	Manhattan.
F. J. Titt, B. S., 1898, Kingfisher College.....	Kingfisher, Okla.
Norman Triplett, 1905, State Normal School.....	Emporia.
E. S. Tucker, 1904, University of Kansas.....	Lawrence.
P. F. Walker, 1905, University of Kansas.....	Lawrence.
J. D. Walters, M. S., 1894, Kansas Agr. College....	Manhattan.
Howard R. Watkins, 1905, Kansas Agr. College.....	Manhattan.
C. D. Weaver, M. D., 1902	McPherson.
Ella Weeks, 1903, Kansas Agricultural College.....	Manhattan.
J. E. Welin, 1899, Bethany College	Lindsborg.
W. B. Wilson, 1903, Ottawa University.....	Ottawa.
E. M. Williams, 1904	Chicago, Ill.
L. B. Wishard, 1903, high school.....	Iola.
C. H. Withington, 1903, Kansas Agricultural College,	Manhattan.
Heman A. Wood, 1905, Kansas Agricultural College..	Manhattan.
H. I. Woods, M. S., 1902, Washburn College.....	Topeka.
L. C. Wooster, 1897, State Normal School	Emporia.
J. A. Yates, M. S., 1898, Ottawa University.....	Ottawa.

Total number of members, January 10, 1906, 204.

PRESIDENT'S ADDRESS
AND PAPERS READ

BEFORE THE

KANSAS ACADEMY OF SCIENCE,

AT

LAWRENCE, 1905.

- I.—PRESIDENT'S ADDRESS.
- II.—CHEMICAL PAPERS.
- III.—GEOLOGICAL PAPERS.
- IV.—BIOLOGICAL PAPERS.
- V.—BOTANICAL PAPERS.
- VI.—MATHEMATICAL AND PHYSICAL PAPERS.
- VII.—MISCELLANEOUS PAPERS.
- VIII.—ANNOUNCEMENTS, ETC.

I.
PRESIDENT'S ADDRESS.

“THE DEVELOPMENT OF THE SCIENCES IN KANSAS.”

By LYMAN C. WOOSTER, Ph. D., State Normal School, Emporia.

II.

CHEMICAL PAPERS.

“THE REACTION OF ANIMAL CELLS TO CHEMICAL STIMULI.”

By FRANK HARTMAN, Kansas City, Kan.

“THE CHEMICAL PROCESSES FOR THE DETECTION OF ORGANIC SUBSTANCES AND MEDICINAL CHEMICALS.”

By L. E. SAYRE, University of Kansas, Lawrence.

“A CHEMICAL STUDY OF THE LIME AND SULFUR DIP.”

By ROSCOE H. SHAW, University of Nebraska, Lincoln, Neb.

“ON THE DURABILITY OF CEMENT PLASTER.”

By E. H. S. BAILEY and W. G. STROMQUIST, University of Kansas, Lawrence.

III.

GEOLOGICAL PAPERS.

“THE UNIVERSITY OF KANSAS EXPEDITION INTO THE JOHN DAY REGION
OF OREGON.”

By C. E. McCLUNG, University of Kansas, Lawrence.

“THE LOUP FORK MIOCENE OF WESTERN KANSAS.”

By CHARLES H. STERNBERG, Lawrence.

“ADDITIONAL OBSERVATIONS ON THE GEOLOGY OF KANSAS.”

By LYMAN C. WOOSTER, Emporia.

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IV.

BIOLOGICAL PAPERS.

“DETERMINATIONS OF SOME TEXAS COLEOPTERA, WITH RECORDS.”

By ELBERT S. TUCKER, University of Kansas, Lawrence.

“ADDITIONS TO THE LIST OF KANSAS DIPTERA.”

By F. F. CREVECŒUR, Onaga.

“THE EFFECT OF LIGHT ON MELILOTUS ALBA (SWEET CLOVER).”

By R. W. COPPEDGE, Mulvane.

“ADDITIONS TO THE LIST OF KANSAS COLEOPTERA, 1905.”

By W. KNAUS, McPherson.

“COLLECTING INSECTS AT NIGHT.”

By ELBERT S. TUCKER, University of Kansas, Lawrence.

“ADDITIONS TO THE LIST OF KANSAS ARACHNIDA.”

By THEO. H. SCHEFFER, Manhattan.

“THE RED PHALAROPE (*CRYMOPHILUS FULICARIUS*), A NEW BIRD FOR THE KANSAS LIST.”

By L. L. DYCHE, University of Kansas, Lawrence.

“NOTES ON SOME MOSQUITOES OF DOUGLAS COUNTY.”

By CHAUNCEY OVERMAN, University of Kansas, Lawrence.

“SOME RESULTS OF THE UNIVERSITY OF KANSAS ENTOMOLOGICAL EXPEDITIONS TO GALVESTON AND BROWNSVILLE, TEX., IN 1904 AND 1905.”

By F. H. SNOW, Lawrence.

“SOME RESULTS OF THE UNIVERSITY OF KANSAS ENTOMOLOGICAL EXPEDITIONS TO ARIZONA IN 1904 AND 1905.”

By F. H. SNOW, Lawrence.

V.
BOTANICAL PAPERS.

“THE BOTANICAL FEATURES OF THE NEW UNITED STATES PHARMACO-
POEIA.”

By L. E. SAYRE, University of Kansas, Lawrence.

“A LITTLE EXPERIMENT IN FLOWER-MAKING.”

By GRACE MEEKER, Ottawa.

“NOTES ON THE FLORA OF THE ROSEBUD INDIAN RESERVATION, SOUTH
DAKOTA.”

By ALBERT B. REAGAN.

VI.

MATHEMATICAL AND PHYSICAL PAPERS.

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